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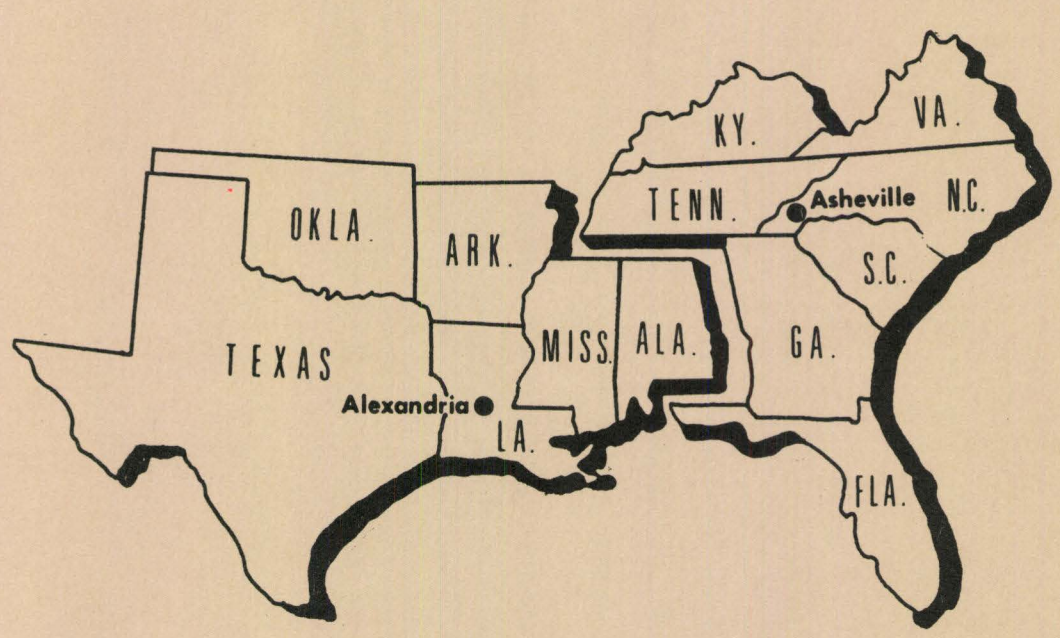
U.S. Forest Service
Asheville, North Carolina



U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
SOUTHEASTERN AREA, STATE AND PRIVATE FORESTRY
DIVISION OF FOREST PEST CONTROL

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INCIDENCE OF COMANDRA BLISTER RUST OUTSIDE THE PREVIOUSLY KNOWN RANGE IN EASTERN TENNESSEE - 1969

U.S. Forest Service
Asheville, North Carolina

By

H.W. Applegate and C.E. Cordell 1/

ABSTRACT

During May and June, 1969, a comandra blister rust survey was made in twelve counties in eastern Tennessee surrounding the previously known area of rust infection. Thirty-six loblolly and shortleaf pine plantations ten years old and younger, encompassing a gross area of 38,000 acres, were examined. Results of the survey revealed the rust in three pine plantations, two loblolly and one shortleaf. The alternate host, false toadflax, was found in only the one shortleaf pine plantation.

INTRODUCTION

Comandra blister rust, *Cronartium comandrae* Pk., a stem canker disease of hard pines, was first found in Tennessee on the Bledsoe State Forest in 1951 (Powers, *et al.*, 1967). It is believed that *C. comandrae* was introduced into the area on infected planting stock from the western United States.

1/ Forest Insect and Disease Specialist, Tennessee Division of Forestry, Knoxville, Tennessee and Forest Pathologist, Division of Forest Pest Control, U.S. Forest Service, Asheville, N.C., respectively.

In 1966, a preliminary survey by the U.S. Forest Service revealed a widespread occurrence of the disease from the vicinity of Crossville in Cumberland County, Tennessee to northern Alabama (Powers, *et al.*, 1967). No infection was detected either east or west of the Cumberland Plateau.

In 1967, the Division of Forest Pest Control, U.S. Forest Service and the Tennessee Division of Forestry conducted a more intensive rust survey. Loblolly pine, *Pinus taeda* L., plantations were sampled in all Tennessee Cumberland Plateau counties. Results obtained from the heaviest rust infection in four adjacent Plateau counties namely, Bledsoe, Cumberland, Sequatchie and Van Buren. No infection was found north of Highway 70 (Cordell and Knighten, 1967).

During the summer of 1967, an infected loblolly pine plantation was found in Coffee County, and in the spring of 1968, heavy infections were found on the University of Tennessee's Highland Rim Experimental Forest in both planted and direct seeded loblolly pine. In addition, *C. comandrae* infected pond pines, *P. serotina* Michx., were found in the Forest Pinetum near Tullahoma in Franklin County (Cordell, *et al.*, 1969). These infected plantations represent the first found off the Cumberland Plateau.

METHODS

This survey was conducted in 36 loblolly and shortleaf pine, *P. echinata* Mill., plantations ten years old and younger, on private land in twelve Tennessee counties (Fig. 1). Sample plantations were selected by Service Foresters of the Tennessee Division of Forestry in their areas of responsibility.

The survey technique employed involved sampling trees along four systematically established transects or rows in each plantation. Two-man survey crews, consisting of the Forest Insect and Disease Specialist and a Service Forester, collected and recorded the data.

Trees were examined for symptoms and/or signs of *C. comandrae* infection. In addition, the presence or absence of the alternate host, false toadflax, *Comandra umbellata* (L.) Nutt. subspecies *umbellata* Piehl, (Piehl, 1965), was noted and recorded. Also, in infected plantations, an estimate of the amount and duration of rust infection was made.

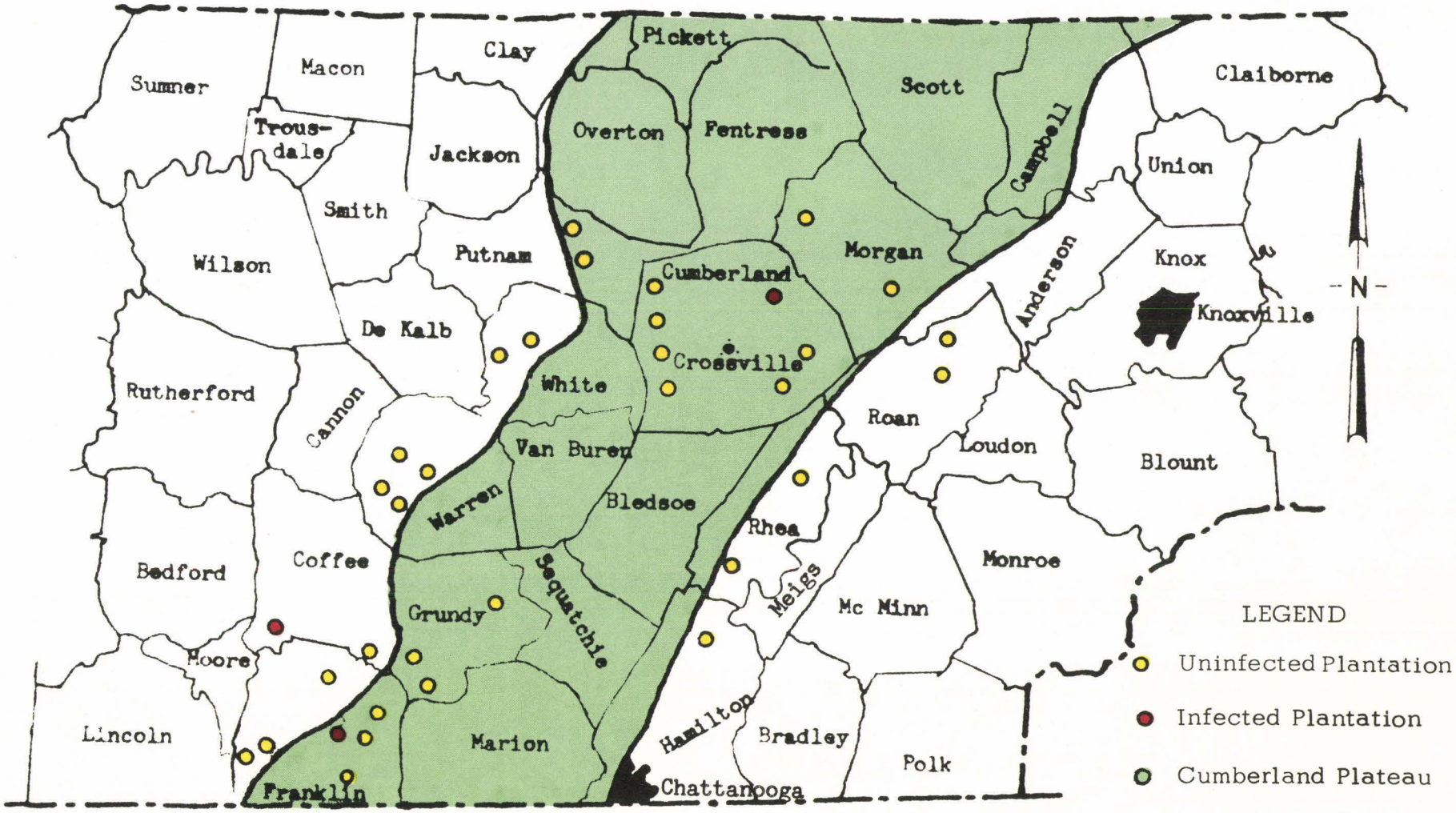

Fig. 1 Loblolly and Shortleaf Pine Plantations Surveyed in Area Surrounding the Known Comandra Blister Rust Range in Eastern Tennessee - 1969.

RESULTS

The results of this survey show that comandra blister rust is confined primarily to the gross area of infection previously described in eastern Tennessee (Cordell and Knighten, 1969).

Three new infected stands were found but all three are within or close to the previously known infected area. One is a shortleaf pine plantation in Cumberland County about ten miles northeast of Crossville. This infection has probably been present for three to four years. Considerable rust-caused mortality was observed in the stand. Toadflax was found in close proximity to the infected pines.

Two comandra rust branch cankers were found in one seven-year-old, five-acre loblolly pine plantation, two miles north of Tullahoma in Coffee County. No toadflax was observed in the plantation. This infection has been present approximately two years.

A single comandra rust branch canker was found in a seven year old loblolly pine experimental planting on the domain of the University of the South at Sewanee, Tennessee. This infection has probably been present since 1968. Again, no toadflax was observed in this plantation.

Toadflax was not observed in any of the remaining 33 plantations surveyed. However, the plant was observed about one-fourth mile from an uninfected loblolly pine plantation sampled in Morgan County near Wartburg.

Personal communication with Hiwassee Land Company personnel [1/] describing the results of a comandra rust infection and damage survey conducted on Company lands on the Plateau, related that *C. comandrae* infected loblolly pines were found in three plantations in White County near the Cumberland County line. This is the first reported occurrence of the disease in White County.

Therefore, to date, comandra rust is known to occur on pines in nine eastern Tennessee counties: Bledsoe, Coffee, Cumberland, Franklin, Marion, Hamilton, Sequatchie, Van Buren and White (Fig. 2).

1/ Mr. Ted Dungjen, Hiwassee Land Company

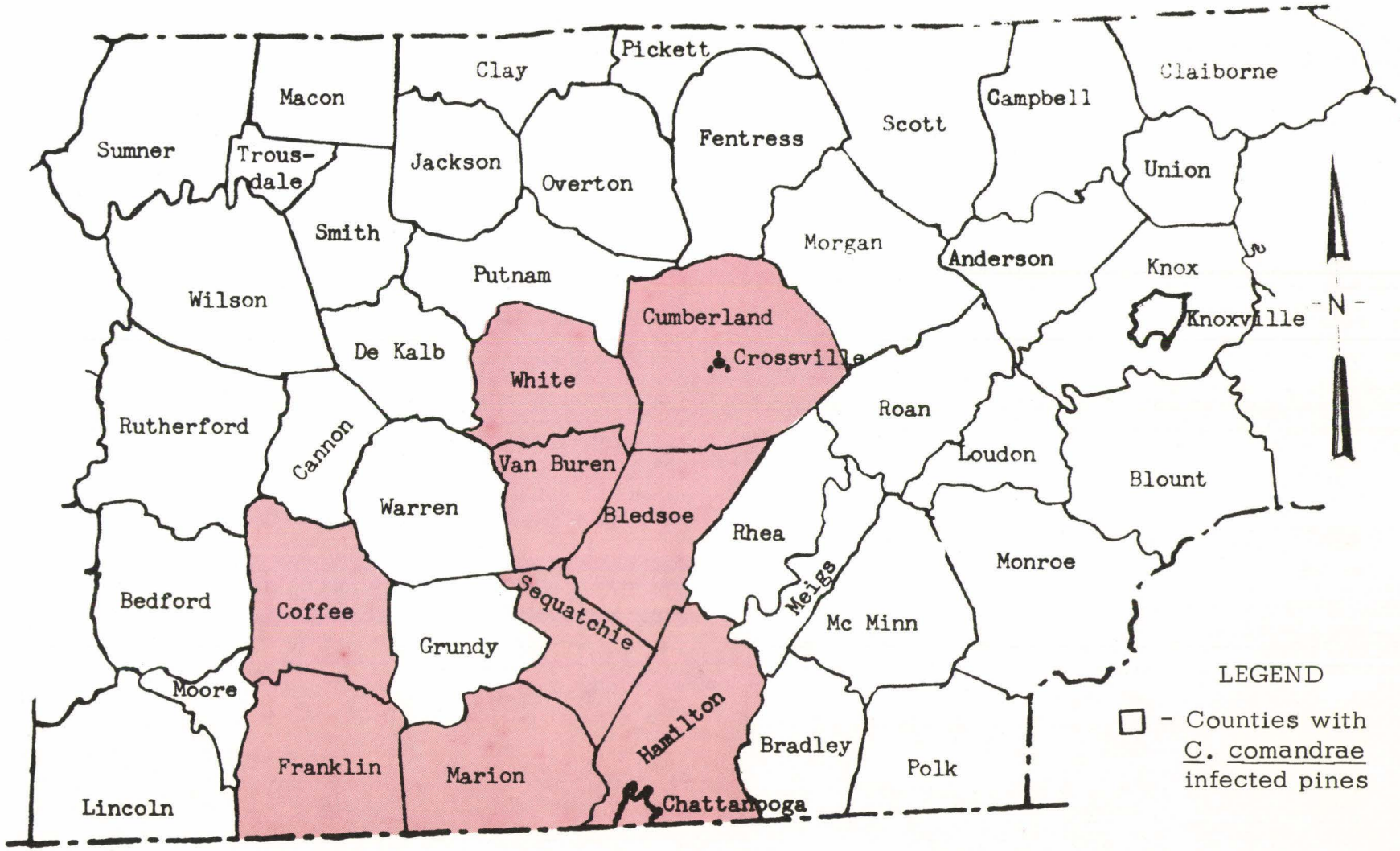

Fig. 2 Distribution of Comandra Blister Rust on the Cumberland Plateau in Eastern Tennessee.

DISCUSSION

Based on the above survey results along with previous survey results and field observations, it is improbable that comandra rust infection will be found to any significant degree outside its presently known range in eastern Tennessee. In most areas west of the Cumberland Plateau, loblolly or shortleaf pine plantations are few and small in size. Moreover, the soil types on which toadflax is normally found on the Plateau and in the adjacent Highland Rim area around Tullahoma give way to different, more productive soils in the west where intensive farming and cultivated fields predominate. Although toadflax may be present in some adjacent areas, it is spotty at best.

East of the Plateau, in the Tennessee Valley, there is considerably more pine than in the west. However, here again the scarcity of toadflax will probably limit the establishment of the disease in the Valley.

If comandra rust is found in additional areas in Tennessee, it will probably be north of its present known range in northern Cumberland County and Morgan, Fentress and Overton Counties where both toadflax and natural shortleaf pine occur. There is apparently a close relationship between rust infection on pines and proximity of the alternate host.

RECOMMENDATIONS

1. A representative number of loblolly and shortleaf pine plantations in Cumberland, Fentress, Overton and Morgan Counties should be selected and surveyed for comandra rust during the spring (May) of 1970. This survey will be conducted by the Tennessee Division of Forestry.

ACKNOWLEDGEMENTS

Grateful acknowledgement is expressed to Dennis Haynes, Robert H. Owens, Robert M. Thompson, Conrad E. Gernt, Robert L. Rochelle, James N. Lockwood and Stephen C. Weber, Service Foresters of the Tennessee Division of Forestry, for their assistance in selecting and sampling plantations in the field.

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More detailed information can be obtained by writing to the Forest Pest Control Division Field Offices listed below or to the Atlanta Office.

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